APPENDIX D

CONSTRUCTION MITIGATION AND RESTORATION PLAN

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

PAGE

INTRODUCTION

This Construction Mitigation and Restoration Plan (CM&R Plan) describes measures to be taken by North Baja Pipeline LLC (NBP) to protect natural resources during construction and operation of the North Baja Project. The CM&R Plan consists of four parts:

- Part I identifies the unique natural characteristics of the project area and describes procedures that will be used to preserve and restore habitat values temporarily impacted by pipeline construction in the desert environment.

- Part II includes portions of the Federal Energy Regulatory Commission's (FERC) Upland Erosion Control, Revegetation, and Maintenance Plan that are relevant to the project area and are designed to minimize project-related construction impacts on soils and minimize erosion.

- Part III includes portions of the FERC's Waterbody Construction and Mitigation Procedures that are relevant to the project area and are designed to minimize project-related disturbance to waterbodies and wetlands.

- Part IV is the Directional Drill Plan that contains specific procedures that will be used during the horizontal directional drilling of the Colorado River and All American Canal.

PART I
DESERT RESTORATION PLAN

This plan is based on an extensive literature review (Harris, 2000) and consultation with local agency experts. It is based on the premise that proper site preparation with attention to conservation of the naturally occuring seed bank is critical to the success of the restoration effort. Both seeding and planting are problematic at best in the unpredictable desert climate. Agency experts from California Department of Fish and Game (CDFG), Bureau of Land Management (BLM), and U.S. Fish and Wildlife Service (USFWS), as well as many published studies, recommend that careful erosion control, topsoil retention and respreading, limited grubbing of native stock, and imprinting are as likely to produce successful desert revegetation as any seeding or planting program. Attention to weed control both during and after construction will contribute significantly to the successful revegetation of the construction area.

The vast majority of the North Baja Project (85 percent) is located in Sonoran creosote bush scrub and desert wash woodland habitat. The fundamental restoration concepts are to allow natural revegetation to take place and to minimize the extent of the area requiring restoration. Key to the plan is proper preparation of the restoration site to facilitate natural revegetation. The most limiting factor for reestablishment of plants in the desert is water, and the low and unpredictable rainfall.

I. COLORADO DESERT SETTING

The Colorado Desert of California is part of the northwestern portion of the Sonoran Desert. The Colorado Desert is distinguished from the Mojave Desert, located to the north, by a bimodal rainfall pattern, with rainfall occurring in the winter and in the summer. Rainfall in the Colorado Desert is typically less than 5 inches per year. The amount and timing of rainfall is variable. Tropical storms may drop rain equal to the yearly average in a few minutes, causing flash floods.

Plant species composition and geomorphology are characterized below for each cover type along with an evaluation of the habitat value of the cover type. Table I-A identifies the main cover types present along the proposed route.

TABLE I-A
Cover Types outside of agricultural and urban lands

Description	Holland (1986)	estimated area within construction corridor	
Native		hectares	acres
Sonoran creosote bush scrub	#33100 Sonoran Creosote Bush Scrub, includes #22200 Stabilized and partially stabilized desert dunes	232.1	573.2
Desert dry wash woodland, including Sonoran microphyll woodland and succulent scrub	#62200 Desert dry wash woodland, includes #61820 Mesquite Bosque	39.2	96.9
Non-native			
Tamarisk Scrub or Woodland	#63810 Tamarisk Scrub	1.6	3.9

SOURCE: Holland, R.F., 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. California Dept. of Fish and Game, Sacramento, CA. 156 pp.

A. NATIVE VEGETATION COMMUNITIES

Sonoran Creosote Bush Scrub – Sonoran Creosote Bush Scrub is the most common native cover type along the proposed route, occupying about 72 percent of the route. Shrubs range from 0.5 to 3 meters tall, are scattered usually with bare ground between plants, and include several succulents. Sonoran creosote bush scrub occurs mainly on well-drained secondary soils of slopes, fans and valleys rather than on sites with thin residual spoils or areas of high soil salinity (Holland 1986). Winter temperatures seldom fall below freezing. Shrubs may be dormant for long periods, but species of ephemeral herbs may flower in late February and March if the winter rains are sufficient. Annuals may bloom after brief precipitation events in summer. This environment provides potential refuge, nesting, and roosting habitat for many wildlife species. Scattered shrubs also provide wildlife dispersal corridors.

Creosote bush (*Larrea divaricata*), brittlebush (*Encelia farinosa.*), and white bursage or burro-weed (*Ambrosia dumosa*), dominate this community, accounting for up to 70 percent of the relative ground cover. Actual percent coverage by perennial vegetation is less than 25 percent. Other species found included white ratany (*Krameria grayi)* and darning-needle cactus (*Opuntia ramossisima*). Sonoran Creosote Bush Scrub is distinguished from Sonoran Microphyll Woodland primarily by the relative absence of native desert trees in the former cover type. Creosote Bush Scrub is recognized by the relative dominance of either creosote or a creosote-burro-weed association. Conversely Sonoran Microphyll Woodland may have creosote and/or burro-weed, but is distinguished by the presence of native desert trees and the more diverse shrub component.

Desert Dry Wash Woodland, including Sonoran Microphyll Woodland – This community type occurs along washes, and arroyo of intermittent streams and is dominated by a low, shrubby, open community with a scattered to locally dense overstory of microphyllous trees. It occupies a total of 4.53 hectares (11.2 acres), or less than two percent of the total construction corridor. Desert wash woodlands are found in sandy or gravely washes and arroyos, typically with braided channels that are substantially rearranged with every surface flow event (Holland 1986). These areas have minimal water available in the summer months, but provide wildlife migration and dispersal corridors as well as refuge, nesting, and roosting habitat for numerous desert species. This cover type has the greatest floral diversity of all the desert areas. Representative species include creosote bush, burro-weed, white ratany, ocotillo (*Fouquieria splendens)*, jojoba (*Simmondsia chinensis*), and darning-needle cactus. Smoke tree (*Psorothamnus spinosus)*, California joint-fir (*Ephedra californica)*, rayless encelia (*Encelia frutescens*), and palo verde (*Cercidium floridum*) are common in the washes.

Stabilized and Partially-Stabilized Desert Dunes – Characteristic plant species include hairy sand-verbena (*Abronia villosa)*, burro-weed, locoweed (*Astragalus* spp.), dalea (*Dalea* spp.), big galleta grass (*Hilaria rigida)*, creosote brush, dune primrose (*Oenothera deltoides*), and mesquite (*Prosopis sp.)*. The cover type is found where dune sand has accumulated in the desert and has become stabilized or partially stabilized by evergreen and/or deciduous shrubs, scattered low annuals, and perennial grasses (Holland 1986). These formations tend to be lower in elevation than the active desert dunes. As a result, the stabilized and partially-stabilized desert dunes retain water just below the sand surface. This hydrologic condition allows perennial vegetation to survive long drought periods.

B. NON-NATIVE VEGETATION COMMUNITIES

Tamarisk Scrub – This cover type is characterized by tamarisk, iodinebush, Russian thistle, and arrowweed, interspersed with patches of common reed and saltgrass. In some areas, small stands of native mesquite persist. This weedy and mostly non-native association differs from Arrowweed Scrub in that tamarisk is the dominant species, although the two cover types are both disturbance-maintained and share similar plant species. Although Holland (1986) has labeled this cover type as a "scrub," it is structurally

more like woodland and is a disturbance-maintained community. Tamarisk competes best against native riparian trees in disturbed areas with elevated salinity. Even in the absence of disturbance, it is unlikely that native willows or cottonwoods could easily repopulate these areas because of the elevated salinities due to past agricultural and water use practices that favor tamarisk.

II. RESTORATION GOALS

Typical of arid habitats, the natural revegetation processes in the Colorado Desert are relatively protracted. Impacts to the landscape take long periods to restore to their original forms. In addition to the intrinsic value of the desert landscape, the Colorado Desert supports a number of special-status plants and animals. The goals of this plan will be to:

- Avoid impacts where practical;
- Where impacts are unavoidable, minimize impacts; and
- Focus on site preparation to facilitate natural processes of revegetation.

Other key elements are to:

- Emphasize final site preparation to encourage natural revegetation;
- Avoid (i.e., preserve), where practical, mature native trees;
- Stipulate a maximum construction corridor width;
- Reserve topsoil and plant materials from the right-of-way before grading, and respread over the right-of-way after construction is complete;
- Imprint the restored right-of-way to provide indentations to catch seed and water;
- Implement best management practices to protect the soil;
- Apply restoration methods that have been shown to work in the desert environment;
- Prevent the spread of noxious weeds or other undesirable species; and
- Apply methods to discourage unauthorized off-highway-vehicle (OHV) use of the pipeline right of way.

III. PLAN IMPLEMENTATION

In addition to prescribing a revegetation program based on enhancing natural processes, this plan includes an experimental supplemental seeding and cactus salvage program (Part E, below).

A. PRECONSTRUCTION PHASE

1. Cover Type Mapping

As part of the preconstruction activities, data was collected on cover types and trees within the right-of-way. Of particular importance were cover types with high components of native trees, namely the Sonoran Microphyll Woodland and Desert Dry Wash Woodland. These data were used to site the pipeline centerline so as to minimize impacts to native trees. In addition, these data will be used to identify the boundaries of non-native cover types, so that vehicle washdown locations can be designated. Areas with greater than 50 percent disturbance will be noted on the maps. Table I-A lists the cover types to be mapped.

2. Identification of Native Tree Areas

Data Collection – Mature, native trees are particularly valuable and important in desert ecosystems. Under the harsh desert conditions, production of a 2-inch-diameter stem may take a tree over one hundred years. Thus impacts to native trees cannot be considered temporary, because regeneration is such a protracted process. Consequently, the primary restoration strategy is preservation where this can be practically achieved. Target native plants include the tree forms of the following species: desert willow, cat's claw acacia, palo verde, desert ironwood, mesquite, smoke tree, and ocotillo.

Concentrations of mature, native trees, defined as plants with a woody stem of > 4 inches diameter at breast height (DBH, measured 4.5 feet above the ground), will be mapped on the construction drawings to show areas where the construction corridor will be limited to 50 feet width. Where tree densities exceed 15 crowns per 500 linear feet of corridor, the corridor will be reduced to 50 feet in width and clearly staked and flagged in the field. In all areas, trees outside the construction corridor, regardless of size, will be protected from construction activities through clear signing and enforcement of the construction area limits.

3. Construction Work Area Restrictions

Measures will be taken to minimize permanent and temporary construction disturbances to facilitate subsequent restoration. Construction will stay within designated construction work areas.

Designated Construction Zone – Project-related vehicle traffic, construction activity, and equipment storage will be restricted to established roads, designated access roads, the working strip, storage areas, staging and parking areas, and other designated project areas. This restriction includes the placement of portable toilet facilities.

Staking – The outside boundaries of the construction corridor will be staked prior to construction with approximately 24-inch-tall flagged or painted stakes at a maximum interval of 300 feet.

Storage, Laydown, and Spoil Disposal Areas – To minimize permanent and temporary construction disturbances, storage facilities will be located at sites that have non-native cover or have been previously disturbed. Parking, storage, and other areas will be marked by flagged lath stakes about 24 inches above ground and placed in line of sight with a maximum spacing of 300 feet.

4. OHV Route Control

NBP and BLM will conduct a joint survey of the pipeline route prior to construction to identify locations where visual blocking of the right of way would help to discourage use of the pipeline corridor by unauthorized OHV traffic. Based on the results of the survey, blocking measures will be employed. Measures may include placement of organic matter and rocks, raking the right-of-way to create a natural appearance, or planting of salvaged cactus and ocotillo (see 5, below). Locations of areas to be blocked and the specific measures to be employed at each area will be specified in the Plan of Development (POD) that will be submitted by NBP and approved by BLM prior to construction.

5. Salvage Cactus and Ocotillo

Immediately prior to ground disturbing activities, cactus and ocotillo will be salvaged from the ROW at select locations, stored, and then replanted after pipeline installation. These cacti and ocotillo will be

used for OHV route control (see 4, above). Larger species of cactus (primarily *Opuntia*) and ocotillo (*Fouquieria splendens*) will be utilized.

Cactus Preservation. In test plot locations in each of the dominant cover types (creosote scrub and desert wash woodland), certain less common genera and species of cactus will be salvaged and replanted. These include, if present, foxtail cactus (*Coryphantha vivipara* var. *alversonii*),hedgehog cactus (*Echinocereus* spp.), nipple cactus (*Mammalaria* spp.), and barrel cactus (*Ferocactus acanthodes*). Exact location and size of test plots will be specified in the research methodology to be presented in the POD.

B. CONSTRUCTION PHASE -- CLEARING

1. Non-Native Cover Types

For tamarisk scrub, restoration objectives during the initial ground clearance and right-of-way preparation will be as follows:

Prevent Spread of Noxious Weeds – For the non-native cover type, restoration goals are to control the spread of noxious weeds to native cover type areas. This would be achieved by disposal of soil and plant materials in non-native areas only. That is, no disposal or transfer of excess spoils or cleared-and-grubbed plant materials into native cover type areas will be allowed. In addition, clearing and grading equipment will have the tires, undersides, and holding areas hosed down to prevent the inadvertent spread of noxious plant seeds and other parts, when these vehicles leave the non-native areas. Disposal methods for tamarisk removed during the clearing of portions of large monotypic tamarisk stands will be specified by the land manager and documented in the POD. Methods may include chipping, hauling, or burning on site. If burning is the selected measure, NBP will apply for the appropriate burning permits.

Restore Hydrology – Where hydrologic features are present, the original surface hydrology will be restored (see section III).

2. Native Cover Types

For the two native cover types (see table I-A), restoration objectives during the initial ground clearance and right-of-way preparation are as follows:

Prevent Spread of Noxious Weeds – Disposal of soil and plant materials from non-native areas will not be allowed in native areas. That is, no disposal or transfer for excess spoils or plant materials from non-native areas will be allowed into native cover type areas.

Clearing and grading equipment will have the tires, undersides, and holding areas hosed down to prevent the inadvertent spread of noxious plant seeds and other parts, before these vehicles enter the native areas. Once the construction corridor has been cleared and graded, vehicles can travel the right-of-way through non-native areas without significant risk of spreading noxious plant material.

Non-native tamarisk trees will be removed from the right-of-way in native areas to discourage colonization of the right-of-way after construction. If possible, removal should occur prior to the set of seeds to reduce the risk of dispersal. Tamarisk small enough to be pulled out by hand will be removed when found. Larger specimens will be mechanically removed during project construction. All identified tamarisk will be removed by the end of project construction. Tamarisk will be disposed of in a manner that prevents the spread of seed. The preferred methods of disposal of tamarisk found in relatively

isolated locations will include hauling off or burning on site. Methods for each area will be specified in the POD. Where burning is the selected measure, NBP will apply for the appropriate burning permits.

Preserve Native Trees – Native trees concentrations will be mapped and direct disturbance avoided to the extent practical (see above).

Restrict Area of Disturbance – The width of the right-of-way will be restricted to minimize impacts to native areas. The standard right-of-way width will be 80 feet. In constrained areas with steep slopes the width may be widened to accommodate equipment for limited stretches. Conversely, where native trees are present in high concentrations, the right-of-way will be restricted to 50 feet width for limited stretches to avoid trees. Only the working strip, public roads, or approved routes of travel will be used. Off-road traffic outside designated areas will be prohibited to protect adjacent native habitat. All project vehicles will turn around only within approved work areas or on designated access roads.

Preservation of the Seed Bank – The upper two to eight inches of topsoil from the portions of the right-of-way requiring grading will be removed first (see also Part II V(B)(1), below). Topsoil will be stockpiled separately from the spoil pile. Topsoil will be temporarily stockpiled in windrows, which will be flagged to clearly identify them. These stockpiles of topsoil will be carefully segregated from the subsoil. Topsoil will be stockpiled under normal circumstances from 2 to 4 weeks, but not longer than 4 months. The topsoil will be evenly respread over the graded area during cleanup. Reserving and respreading topsoil is designed to conserve the seed bank, aiding in natural revegetation. Imprinting will be used to provide microcatchment areas for water retention and seed germination. Imprinting may be accomplished through the use of a "sheepsfoot" roller or other methods.

Encourage Regeneration of Woody Plants – Areas that must be scraped or graded will be restricted to that necessary to create a safe working area for construction. Naturally level areas, for example, may require no grading. In areas requiring no grading, grubbing of the right-of-way in native habitat areas will leave the underground roots of woody plants intact. That is, the grubbing will skim the surface of the ground to crush or slice off the above-ground portions of vegetation, leaving the root crowns intact. This will allow for rapid regeneration of woody plant species.

Native plant material that has been grubbed from the right-of-way will be respread on the right-of-way after pipeline installation, providing a mulch to trap seeds, shade seedlings, and conserve water for the revegetation of the right-of-way. In areas where topsoil is removed, the plant material will be respread with the topsoil.

Restore Hydrology – Where hydrologic features are present, the original surface hydrology will be restored. See Section III, below.

C. CONSTRUCTION PHASE – CLEAN-UP

Once the pipeline has been installed and the pipeline trench backfilled, the right-of-way will be recontoured to approximate original contours. Recontouring to natural lines and grade will be accomplished without disruption to adjacent undisturbed habitat.

After topsoil and native plant material has been respread over the graded areas at the completion of construction, these areas will be imprinted with a sheepsfoot or similar device. The indentations created by the imprinter should catch seed and water, aiding in the natural revegetation of the site. Native plant material that had been removed from the right-of-way will provide a mulch to trap seeds, shade seedlings, and conserve water for the revegetation of the right-of-way.

D. POSTCONSTRUCTION

Postconstruction monitoring and maintenance of the pipeline right-of-way will be according to the overall project plan (see Section F, this Part, and Parts II, and III, below). Of particular relevance will be monitoring of erosion and repairs to maintain the integrity of the line.

E. EXPERIMENTAL SUPPLEMENTAL SEEDING

The supplemental seeding is an experimental program designed to assess the efficacy of the enhanced natural revegetation approach, taken in this plan, by comparing it to supplemental seeding and cactus salvage. Study plots will be established in both of the major native cover types found along the ROW. These two cover types are Sonoran creosote bush scrub and desert dry wash woodland, including Sonoran microphyll woodland and succulent scrub. Treatment plots along the ROW will receive two different seed mixes and two different application rates. Control plots will be established in undisturbed areas immediately adjacent to the ROW. Data will be collected over a 5-year period so that treatment plots may be statistically compared to control plots. Our study questions will be:

- Is there a differential revegetation response for supplemental seeded plots compared to not seeded study plots for the following variables:
  - Type of seed supplement
  - Rate of seed supplement
- Is there a differential revegetation response between the ROW and the immediately adjacent undisturbed area for the following variables:
  - Wood plant species composition
  - Native plant species composition
  - Growth and regeneration of woody plants
  - Cover of woody plants
  - Cover of herbaceous plants
  - Cover of non-native plant species

A detailed research methodology for the experimental supplemental seeding and cactus salvage program will be provided in the POD.

F. SURVEY, MONITORING, AND REPORTING

Surveys will be conducted for non-native invasive plant species after construction is complete. They will be compared to the preconstruction survey conducted to determine locations of weed infestations attributable to this project. NBP will be responsible for weed survey and control two times a year for the

two years, then once a year thereafter as part of its routine maintenance and operation of the pipeline. The first survey after construction will be conducted after rainfall and will consist of walking the entire line, looking for new weed infestations. Thereafter, surveys may be conducted aerially with spot ground checks in areas of infestations. Weed control will accompany the survey, as tamarisk, the most likely invader, can be most efficiently controlled by pulling by hand, bagging, and disposing of in approved sites.

The entire line will also be monitored for success of restoration of desert vegetation in addition to the routine monitoring specified in Part II, Sections II, III, and VIII, below. Results of the weed control program, this monitoring, and the experimental seeding and cactus salvage program will be provided in full annual reports to BLM for the first, second, and fifth year after construction. Data from annual surveys will be presented to BLM for the third and fourth years. The fifth year report will provide an overall summary of the success of weed control, mainline restoration, and the experimental seeding and salvage programs.

PART II
EROSION CONTROL

I. APPLICABILITY

A. This Plan applies to all natural gas construction projects where it is imposed by the Commission or agreed to by project sponsors and shall be used for all nonwetland areas of a project. However, the staff encourages using this Plan for all construction and abandonment activities. Wetland and waterbody systems are addressed in the Wetland and Waterbody Construction and Mitigation Procedures **(Procedures, Part III)**.

Deviations that involve measures different from those contained in this Plan will only be permitted as certificated by the Commission or by written approval of the Director of the Office of Energy Projects (OEP), or his/her designee, unless specifically required in writing by another Federal, state, or Native American land management agency for the portion of the project on its land. NBP will file other agency requirements with the Secretary of the Commission (Secretary) before construction (FERC Plan, Section I.A, modified).

B. The intent is to confine project-related disturbance to certificated areas (such as construction right-of-way, extra work areas, pipe storage yards, and access roads), and to minimize erosion and enhance revegetation in those areas. Any project-related ground disturbance (including erosion) outside of these areas is subject to compliance with all applicable survey and mitigation requirements. (FERC Plan I.B modified)

C. NBP has filed the locations and dimensions of all areas that will be disturbed by project-related activities, including pipe storage yards, contractor yards, disposal areas, and access roads as part of its application. Any changes will be filed with the Secretary of the Commission (Secretary) and all other federal or state agencies having jurisdiction over the project before construction. (FERC Plan, Section I.C modified)

II. PRECONSTRUCTION FILING

A. NBP will file with the Secretary of the Commission (Secretary) a copy of its Stormwater Pollution Prevention Plan prepared for compliance with the U.S. Environmental Protection Agency's National Stormwater Program General Permit requirements. This plan will be available in the field on each construction spread and will include the Spill Prevention, Containment, and Countermeasure Plan (FERC Plan, Section II, A modified)

B. NBP shall file with the Secretary all written requirements from Federal, state, or Native American land management agencies regarding erosion control, revegetation, or maintenance for the project that deviate from this CM&R Plan. (FERC Plan Section II.B)

III. SUPERVISION AND INSPECTION (FERC Plan, Section III, A. and B.)

A. ENVIRONMENTAL INSPECTION

1. At least one Environmental Inspector is required for each construction spread during active construction or restoration.

2. Environmental Inspectors shall have peer status with all other activity inspectors.

3. Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the FERC certificate or other authorizations and order corrective action.

B. RESPONSIBILITIES OF THE ENVIRONMENTAL INSPECTORS

At a minimum, the Environmental Inspector(s) shall be responsible for:

1. Ensuring compliance with the requirements of this CM&R Plan, the environmental conditions of the FERC certificate authorization, the mitigation measures proposed by NBP its application submitted to FERC, and other environmental permits and approvals;

2. Verifying that the limits of authorized construction work areas and locations of access roads are properly marked before clearing;

3. Verifying the location of drainage and irrigation systems;

4. Identifying stabilization needs in all areas;

5. Locating dewatering structures and slope breakers to ensure they will not direct water into known cultural resources sites or locations of sensitive species;

6. Verifying that trench dewatering activities do not result in the deposition of sand, silt, and/or sediment near the point of discharge into a wetland or waterbody. If such deposition is occurring, the dewatering activity shall be stopped and the design of the discharge shall be changed to prevent reoccurrence;

7. Testing subsoil and topsoil in agricultural and residential areas to measure compaction and determine the need for corrective action;

8. Advising the Chief Inspector when conditions (such as wet weather) make it advisable to restrict construction activities in agricultural areas;

9. Ensuring restoration of contours and topsoil;

10. Approving imported soils for use in agricultural and residential areas;

11. Ensuring that temporary erosion controls are properly installed and maintained, daily if necessary;

12. Inspecting temporary erosion control measures at least:

    - on a daily basis in areas of active construction or equipment operation;
    - on a weekly basis in areas with no construction or equipment operation; and
    - within 24 hours of each 0.5 inch of rainfall;

13. Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification;

14. Keeping records of compliance with the environmental conditions of the FERC certificate, and the mitigation measures proposed by NBP in the application submitted to the FERC, and other Federal or state environmental permits during active construction and restoration; and

15. Establishing a program to monitor the success of restoration. Implementation of this program may be transferred to the company's operating section upon completion of construction and restoration activities.

IV. PRECONSTRUCTION PLANNING

NBP will complete the following before construction:

A. DRAIN TILE AND IRRIGATION SYSTEMS

1. Contact landowners to locate fields containing drainage tiles and irrigation systems. (FERC Plan Section IV. A.1.)

2. Contact landowners and local soil conservation authorities to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction. (FERC Plan Section IV.A.2.)

B. ROAD CROSSINGS AND ACCESS POINTS (FERC Plan Section IV, C.)

Plan for safe and accessible conditions at all roadway crossings and access points during construction and restoration.

C. DISPOSAL PLANNING (FERC Plan Section IV.D.)

Determine methods and locations for the disposal of brush and excess rock. Off-site disposal is subject to compliance with all applicable survey and mitigation requirements.

D. AGENCY COORDINATION

1. Obtain recommendations from the local soil conservation authorities or land management agencies regarding erosion control and restoration specifications, both temporary and permanent. Incorporate all agreed-upon recommendations into the CM&R Plan, and on alignment sheets, if required. (FERC Plan IV.E.2 modified)

2. Develop specific procedures in coordination with the appropriate agency to prevent the introduction or spread of noxious weeds and soil pests resulting from construction and restoration activities. At a minimum, NBP will wash all equipment transferred from Arizona to California at the washing station in Ehrenberg to ensure that equipment arriving on site in California is clean and will wash down clearing and grading equipment before moving equipment from non-native into native vegetation areas as outlined in Part I of this CM&R Plan. (FERC Plan IV.E.3 modified)

V. INSTALLATION

A. APPROVED AREAS OF DISTURBANCE (FERC Plan V.A.)

1. Confine construction activity and ground disturbance to certificated areas.

2. The construction right-of-way width shall not exceed that described in the NBP's FERC application unless otherwise modified by a certificate condition. However, additional construction right-of-way may be used (subject to compliance with all applicable survey and mitigation requirements) in limited areas for full right-of-way width topsoil segregation or where topographic conditions, such as side-slopes, require it to ensure safe construction. In no case shall the construction right-of-way width exceed 100 feet without the prior written approval of the Director of OEP.
3. Every attempt will be made in agricultural areas (approximate MPs 0.0 to 11.5) to curb dust attributable to pipeline construction from blowing onto crops. Use of water trucks by the contractor during pipeline construction will be required.

4. NBP will consult with landowners to ensure that the pipeline is buried beneath the depth of deep ripping.

B. TOPSOIL SEGREGATION

1. Use topsoil segregation methods in all residential areas and when the construction right-of-way is wider than 30 feet in: (FERC Plan Section V.B.1)

   - native desert habitats;
   - annually cultivated or rotated agricultural lands (except pasture);
   - hayfields; and
   - other areas at the landowner's request.

2. In agricultural fields, to maintain the integrity of the temporarily displaced topsoil horizon (depth to be determined before construction), 1 to 2 feet of trench top soil will be stockpiled at the edge of the right-of-way so that it can be replaced, as nearly as possible in the topsoil's original position – the uppermost portion of the pipeline trench.

3. In residential areas topsoil replacement (i.e., importation of topsoil) is an acceptable alternative to topsoil segregation. (FERC Plan Section V.B.3)

C. IRRIGATION (FERC Plan Section V.D)

Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.

D. ROAD CROSSINGS AND ACCESS POINTS

1. Maintain safe conditions at all road crossings in accordance with the road crossing (FERC Plan V.E.1)

E. TEMPORARY EROSION CONTROL (FERC Plan V.F)

The project area is relatively level, except for the segment between approximate MPs 28.4 and 35.0. This segment includes the foothills of the Palo Verde Mountains that are characterized by steep stony slopes and incised washes. NBP does not propose to install erosion controls, except as specified in Part III and Part IV of this CM&R Plan. This is because of the level topography along most of the route, the stony soils and steep terrain in the Palo Verde Mountain area, and the lack of rainfall. When rainfall does occur, it is heavy enough to cause flash flooding which would render typical erosion controls (silt fence, hay bales, etc.) ineffective.

VI. RESTORATION

A. CLEANUP

1. Make every effort to complete final cleanup of an area (including final grading and installation of permanent erosion control structures) within 10 days after backfilling the trench in that area. If this schedule cannot be met, final cleanup must be completed as soon as possible. (FERC Plan VI.A.1 modified)

2. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control. When access is no longer required the travel lane must be removed and the right-of-way restored. (FERC Plan VI.A.2 modified)

3. Excess rock, including blast rock may be used to backfill the trench to the top of the existing bedrock profile. (FERC Plan VI.A.3)

4. Remove excess rock from at least the top 12 inches of soil to the extent practicable in all rotated and permanent cropland, hayfields, pastures,

residential areas, and other areas at the landowner's request. The size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction. Make diligent efforts to remove stones greater than 4 inches if the off right-of-way areas do not contain stones greater than 4 inches. The landowner may approve other rock size provisions in writing. (FERC Plan VI.A.4)

5. Remove construction debris from the right-of-way and grade the right-of-way to leave the soil in the proper condition for planting. (FERC Plan VI.A.5)

B. PERMANENT EROSION CONTROL DEVICES

1. Trench Breakers

   a. Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as sand bags or polyurethane foam. Do not use topsoil in trench breakers. (FERC Plan VI.B.1.a)

   b. An engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at the same spacing as and upslope of permanent slope breakers. (FERC Plan VI.B.1.b)

   c. Install trench breakers at the base of slopes adjacent to waterbodies and wetlands and where needed to avoid draining of a wetland. (FERC Plan VI.B.1.d)

C. SOIL COMPACTION MITIGATION (FERC Plan VI.C)

1. Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to identify approximate preconstruction conditions. Use U.S. Army Corps of Engineers-style cone penetrometers or other appropriate devices to conduct tests.

2. Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil. Alternatively, make arrangements with the landowner to plant and plow under a "green manure" crop, such as alfalfa, to decrease soil bulk density and improve soil structure. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

3. Perform appropriate soil compaction mitigation in severely compacted residential areas.

VII. OFF-ROAD VEHICLE CONTROL

Where requested, NBP will offer to install and maintain measures to control unauthorized vehicle access to the right-of-way. These may include signs or other barriers along the right-of-way. (FERC Plan VII. Modified) See also Part I, above.

VIII. POST-CONSTRUCTION ACTIVITIES

A. MONITORING AND MAINTENANCE

1. Conduct follow-up inspections of all disturbed areas after the first and second growing seasons to determine the success of restoration. (FERC VIII.A.1 modified)

2. Monitor crops for at least 2 years to determine the need for additional restoration. (FERC Plan VIII.A.2)

3. Restoration shall be considered successful if upon visual survey the density and cover of crops in cultivated cropland are similar in density and cover to adjacent undisturbed lands. If vegetative cover and density are not similar or there are excessive noxious weeds after two full growing seasons, a professional agronomist shall determine the need for additional restoration measures. Implement the measures recommended by the agronomist. (FERC Plan VIII.A.3 modified to address agricultural areas only)

4. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in active agricultural areas. (FERC Plan VIII.A.4)

5. To facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be maintained annually. (FERC Plan VIII.B.5 modified to remove references to regular maintenance of right-of-way).

6. In native desert habitats, restoration shall be considered successful if the right-of-way surface condition is similar in species composition to adjacent undisturbed lands. (FERC Plan VIII.B.6 modified)

7. Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and vehicle trails as necessary. (FERC Plan VIII.B.7)

B. REPORTING

1. NBP shall file with the Secretary quarterly activity reports documenting problems, including those identified by the landowner, and corrective actions taken for at least 2 years following construction.

PART III
WETLANDS AND WATERBODIES

I. APPLICABILITY

A. These Procedures apply to all natural gas construction projects where they are imposed by the Commission or agreed to by project sponsors and shall be used for all wetlands and waterbodies affected by a project. Deviations that involve measures different from those contained in these Procedures will only be permitted as certificated by the Commission or by written approval of the Director of the Office of Energy Projects (OEP), or his/her designee, unless specifically required in writing by another Federal, state, or Native American land management agency for the portion of the project on its land. The project sponsor shall file other agency requirements with the Secretary of the Commission (Secretary) before construction (FERC Procedures I.D).

B. The intent of these Procedures is to minimize the extent and duration of project-related disturbance of wetlands and waterbodies. Any project-related ground disturbance (including erosion) inside or outside of the certificated areas is subject to compliance with all applicable survey and mitigation requirements (FERC Procedures I.D).

C. DEFINITIONS (FERC Procedures I.C)

1. "waterbody" includes any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes:

    a. "minor waterbody" includes all waterbodies less than or equal to 10 feet wide at the water's edge at the time of construction;

    b. "intermediate waterbody" includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of construction;

    c. "major waterbody" includes all waterbodies greater than 100 feet wide at the water's edge at the time of construction.

2. "wetland" includes any area that satisfies the requirements of the current Federal methodology for identifying and delineating wetlands.

II. PRECONSTRUCTION FILING

A. NBP shall file with the Secretary before construction the hydrostatic testing information and an updated wetland delineation report, if needed. (FERC Procedures II.A)

B. NBP shall file with the Secretary required site-specific construction plans prepared to comply for review and written approval by the Director of OEP before construction. (FERC Procedures II.B)

C. NBP will file an updated Spill Prevention, Containment, and Countermeasure Plan to provide project-specific construction details, including: (FERC Procedures II.C and IV.A modified)

1. Storage locations and method of storage for all fuels, lubricants, and hazardous materials within the 18th Avenue and Ripley contractor yards in the Palo Verde Valley.

2. Specific procedures that will be used to refuel construction equipment within 100 feet of the canals and drains in the Palo Verde Valley.

3. Names and telephone numbers of all state agencies and individuals that will be contacted in the event of a spill.

D. The project sponsor shall prepare a schedule identifying when trenching or blasting would occur within each waterbody greater than 10 feet wide, or within any coldwater fishery. The project sponsor shall file the schedule with the Secretary within 30 days of the acceptance of the certificate and revise it as necessary to provide at least 14 days advance notice. Changes within this last 14-day period must provide for at least 48 hours advance notice.

III. WATERBODY CROSSINGS

A. NOTIFICATION PROCEDURES AND PERMITS

1. NBP will provide written notification to the U.S. Army Corps of Engineers (COE) of the proposed construction activities. (FERC Procedures V.A.1)

2. NBP will apply for state-issued waterbody crossing permits and obtain individual or generic section 401 water quality certification or waiver. (FERC Procedures V.A.3)

B. INSTALLATION

NBP will cross the Colorado River and All American Canal (both major waterbodies) using a directional drill. The other waterbodies crossed on the North Baja Project (with the exception of Canal D-10-13 and Rannells Drain) are canals and drainage ditches that will be crossed within 18th Avenue using the existing culverts and road fill. Canal D-10-13 will be bored. Rannells Drain will be crossed using an open cut.

The following will apply for the crossings of canals and drainage ditches:

1. Extra Work Areas

   a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from waterbody boundaries, where topographic conditions permit. If topographic conditions do not permit

a 50-foot setback, these areas must be located at least 10 feet from the --water's edge.

b. NBP will file with the Secretary for review and written approval by the Director of OEP before construction site-specific construction plans for those extra work areas with a less than 50-foot setback from waterbody boundaries and a site-specific explanation of the conditions that will not permit a 50-foot setback.

c. Limit clearing of vegetation between extra work areas and the edge of the waterbody to the certificated construction right-of-way.

d. Limit the size of extra work areas to the minimum needed to construct the waterbody crossing. (FERC Procedures V.B.2.e)

2. General Crossing Procedures

a. Comply with section 404 nationwide permit program terms and conditions (33 CFR Part 330). (FERC Procedures V.B.3.a)

b. Construct crossings as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit. (FERC Procedures V.B.3.b)

c. Maintain adequate flow rates to protect aquatic life, and prevent the interruption of existing downstream uses. (FERC Procedures V.B.3.e)

d. Storage of hazardous materials, chemicals, fuels, lubricating oils, or concrete coating activities within 100 feet of any waterbody or within any designated municipal watershed area will be done in compliance with the project-specific SPCC Plan. (FERC Procedures V.B.3.f modified to allow these activities along 18th Avenue)

e. Construction equipment refueled within 100 feet of a waterbody, will follow the procedures outlined in the project-specific SPCC Plan. (FERC Procedures V.B.3.g modified to allow refueling within 100 feet of the canals and drains along 18th Avenue)

3. Spoil Pile Placement and Control

a. All spoil must be placed in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas . (FERC Procedures V.B.4.a modified)

b. Use sediment barriers to prevent the flow of spoil into any waterbody. (FERC Procedures V.B.4.b)

4. Crossings of Intermediate Waterbodies (e.g. Rannells Drain)

   a. Install sediment barriers across the entire construction right-of-way at Rannell's Drain.

   b. Limit use of equipment operating in the waterbody to that needed to construct the crossing. (FERC Procedures V.B.8.a)

   c. Attempt to complete trenching and backfill work within the waterbody (not including bank grading) within 48 hours, unless site-specific conditions make completion within 48 hours infeasible. (FERC Procedures V.B.8.c modified)

   d. Install sediment barriers immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. (FERC Procedures V.B.10)

   e. Use trench plugs to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody. Trench plugs must be of sufficient size to withstand upslope water pressure. (FERC Procedures V.B.10.c)

   f. Stabilize banks and install temporary sediment barriers within 24 hours of completing the crossing. (FERC Procedures V.C.2 modified)

   g. Return banks to preconstruction contours as closely as possible. (FERC Procedures V.C.3 modified)

   h. Revegetate disturbed riparian areas with conservation grasses and legumes or native plant species. (FERC Procedures V.C.6 modified to exclude woody species)

   i. Remove all temporary sediment barriers when restoration of adjacent upland areas is successful. (FERC Procedures V.C.7)

5. Temporary Erosion Controls

   a. For all canals and drains that are adjacent to the construction right-of-way, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the right-of-way. (FERC Procedures V.B.10.b modified)

6. Trench Dewatering (FERC Procedures V.B.11)

   Dewater trench in such a manner that no heavily silt-laden water flows into any waterbody.

C. POST-CONSTRUCTION MAINTENANCE

1. Vegetation maintenance adjacent to waterbodies or in dry washes will be limited to that needed to facilitate periodic pipeline corrosion/leak surveys. (FERC Procedures V.D.1 modified)

2. No herbicides or pesticides will be used in or within 100 feet of a waterbody except as specified by the appropriate land management or state agency. (FERC Procedures V.D.2)

VI. WETLAND CROSSINGS

NBP has completed wetland delineations along the North Baja Project route. A total of 9 wetlands were identified with a total crossing length of 2,280 feet. Construction impact on four of the wetlands will be avoided by the directional drills of the Colorado River (two wetlands) and All American Canal (two wetlands). Of the remaining five wetlands, four will be crossed by the pipeline and one will be crossed by the existing Access Road IMCA-30. Dominant species within three wetlands (MPs 28.2 and 28.5) are tamarisk, iodine bush, and greasewood (non-native species). No aboveground facilities will located within any delineated wetland boundary.

A. NOTIFICATION PROCEDURES AND PERMITS (FERC Procedures VI.A)

1. NBP will provide written notification to the COE concerning the proposed construction activities.

2. NBP will apply for state-issued wetland crossing permit(s) and obtain individual or generic section 401 water quality certification or waiver.

B. GENERAL

1. NBP has conducted a wetland delineation using the current Federal methodology and will update this wetland delineation report and file it with the Secretary before construction, if required. This report identifies: (FERC Procedures VI.B Modified)

   a. by milepost all federally delineated wetlands that would be affected;

   b. the National Wetlands Inventory (NWI) classification for each wetland;

   c. the crossing length of each wetland in feet; and

   d. the area of permanent and temporary disturbance that would occur in each NWI classification type.

2. The pipeline has been routed to avoid wetland areas to the maximum extent possible. If a wetland cannot be avoided or crossed by following an existing right-of-way, route the new pipeline in a manner that minimizes disturbance to wetlands. (FERC Procedures VI.B.2 modified)

C. INSTALLATION

1. Extra Work Areas and Access Roads

   a. Limit the size of extra work areas to the minimum needed to construct the wetland crossing. (FERC Procedures VI.C.1.d)

2. Crossing Procedures

   a. Comply with section 404 nationwide permit program terms and conditions (33 CFR Part 330). (FERC Procedures VI.C.2.a)

   b. Minimize the duration of construction-related disturbance within wetlands. (FERC Procedures VI.C.2.c)

   c. Cut vegetation off at ground level, leaving existing root systems in place, and remove it from the wetland for disposal if the wetland is dominated by native species. (FERC Procedures VI.C.2.e modified)

   d. Limit construction equipment operating in wetland areas to that needed to clear the right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the right-of-way. All other construction equipment shall use access roads located in upland areas to the maximum extent practicable. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the right-of-way.

   e. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the right-of-way in wetlands unless the Chief Inspector and Environmental Inspector determine that safety-related construction constraints require removal of tree stumps from under the working side of the right-of-way.

   f. Segregate the top 1 foot of topsoil from the area disturbed by trenching. except in areas where standing water or saturated soils are present. After backfilling is complete, restore the segregated topsoil to its original location. (FERC Procedures VI.C.2.g)

   g. Do not store hazardous materials, chemicals, fuels, lubricating oils, or perform concrete coating activities in a wetland, or within 100 feet of any wetland boundary. (FERC Procedures VI.C.2.h)

h. Attempt to refuel all construction equipment in an upland area at least 100 feet from a wetland boundary. If construction equipment must be refueled in a wetland or within 100 feet of any wetland boundary, follow the procedures outlined in the project-specific SPCC Plan. (FERC Procedures VI.C.2.i)

i. Do not use rock (except as allowed by item j. below), soil imported from outside the wetland, tree stumps, or brush riprap to stabilize the right-of-way.

j. If standing water or saturated soils are present, use low-ground-weight construction equipment, or operate normal equipment on timber riprap, prefabricated equipment mats, or geotextile fabric overlain with gravel. Geotextile fabric used for this purpose must be strong enough to allow removal of all gravel and fabric from the wetland.

k. Remove all timber riprap, prefabricated equipment mats, geotextile fabric, and overlying gravel upon completion of construction.

3. Temporary Sediment Control

a. Install sediment barriers (as defined in section V.F.2.a. of the Plan) immediately after initial disturbance of the wetland or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench). Except as noted below in section VI.3.c., maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan.

b. Install sediment barriers across the entire construction right-of-way immediately upslope of the wetland boundary at all wetland crossings, as necessary to prevent sediment flow into the wetland

c. Where wetlands are adjacent to the construction right-of-way, install sediment barriers along the edge of the construction right-of-way as necessary to prevent sediment flow into the wetland.

4. Trench Dewatering (FERC Procedures VI.B.4)

Dewater trench in such a manner that no heavily silt-laden water flows into any wetland or waterbody.

D. RESTORATION

1. Where the pipeline trench may drain a wetland, construct trench breakers and/or seal the trench bottom as necessary to maintain the original wetland hydrology. (FERC Procedures VI.D.1)

2. For each wetland crossed, install a permanent slope breaker and a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. Locate the trench breaker immediately upslope of the slope breaker.

3. Consult with the appropriate land management or state agency and develop plans for active revegetation of wetlands affected by construction. The revegetation plans should include specifications for the planting of native wetland species. Provide these plans to the FERC staff upon request.

4. Develop specific procedures in coordination with the appropriate land management or state agency, where necessary, to prevent the invasion or spread of undesirable exotic vegetation. (FERC Procedures VI.D.7)

5. For all forested wetlands affected:

   a. plant native trees to ultimately restore the temporary right-of-way and the non-maintained portion of the permanent right-of-way to its preconstruction state;

   b. plant native shrub and herbaceous species to revegetate the 30-foot-wide portion of the permanent right-of-way selectively maintained as described in section VI.E.1.; and

   c. consult with the U.S. Fish and Wildlife Service, the EPA, the COE, and the appropriate state agency to determine the density for planting the native trees and shrubs.

6. Ensure that all disturbed areas permanently revegetate with native wetland herbaceous and/or woody plant species.

7. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are judged to be successful as specified in section VIII.A.6. of the Plan.

E. POST-CONSTRUCTION MAINTENANCE

1. Do not conduct vegetation maintenance over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be maintained in a herbaceous state. In addition, trees within 15 feet of the pipeline that are greater than 15 feet in height may be selectively cut and removed from the right-of-way.

2. No vegetation maintenance will be conducted over the full width of the permanent right-of-way in wetlands. (FERC Procedures VI.E.1 modified)

3. Do not use herbicides or pesticides in or within 100 feet of a wetland, except as specified by the appropriate land management agency or state agency. (FERC Procedures VI.E.2)

4. Monitor the success of wetland revegetation annually for the first 3 to 5 years after construction. Revegetation should be considered successful if the cover of native herbaceous and/or woody species is at least 80 percent of the total area, and the diversity of native species is at least 50 percent of the diversity originally found in the wetland. If revegetation is not successful at the end of 3 years, develop and implement (in consultation with a professional wetland ecologist) a remedial revegetation plan to actively revegetate the wetland with native wetland herbaceous and woody plant species. Continue revegetation efforts until wetland revegetation is successful.

VII. HYDROSTATIC TESTING (FERC Procedures VII)

A. NOTIFICATION PROCEDURES AND PERMITS (FERC Procedures VII.A)

1. Apply for state-issued withdrawal permits, as required.

2. Apply for National Pollutant Discharge Elimination System (NPDES) or state-issued discharge permits, as required.

3. Notify appropriate state agencies of intent to use specific sources at least 48 hours before testing activities unless they waive this requirement in writing.

B. GENERAL

1. Perform 100 percent radiographic inspection of all pipeline section welds or hydrotest the pipeline sections, before installation under waterbodies or wetlands. (FERC Procedures VII.B.1)

2. If pumps used for hydrostatic testing are within 100 feet of any waterbody or wetlands, address the operation and refueling of these pumps in the SPCC Plan prepared as described in section IV.A. (FERC Procedures VII.B.2)

C. INTAKE SOURCE AND RATE

1. Screen the intake hose to prevent entrainment of fish. (FERC Procedures VII.C.1)

2. Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable. (FERC Procedures VII.B.4)

D. DISCHARGE LOCATION, METHOD, AND RATE

1. Regulate discharge rate, use energy dissipation device(s), and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive streamflow. (FERC Procedures VII.D.1)

2. Do not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate Federal,

state, and local permitting agencies grant written permission. (FERC Procedures VII.D.2)

3. Provide a copy of the results of sampling conducted in accordance with NPDES or state-issued discharge permit requirements to the Commission's environmental staff upon request. (FERC Procedures VII.D.3)

PART IV
HORIZONTAL DIRECTIONAL DRILL PLAN

I. INTRODUCTION

This directional drill contingency plan identifies specific procedures and steps to contain inadvertent releases of drilling mud for waterbodies that are crossed using horizontal directional drilling techniques. NBP proposes to directionally the Colorado River and the All American Canal. While waterway crossings vary substantially in installation depth, current profile data indicates a minimum depth of cover of 60 feet for the Colorado River and 30 feet for the All American Canal. Pipe used for the directionally drilled crossings will be 36-inch-diameter, for the Colorado River and 30-inch-diameter for the All American Canal.

II. HORIZONTAL DIRECTIONAL DRILLING PROCESS

Installation of a pipeline by horizontal directional drilling is generally accomplished in three stages. The first stage consists of directionally drilling a small diameter pilot hole along a pre-determined path. The second stage enlarges this pilot hole to a diameter that will accommodate the pipeline. Numerous "reaming" passes will be necessary with each pass enlarging the diameter of the pilot hole incrementally. The third stage involves pulling the pipeline through the enlarged hole.

During the drilling of the pilot hole, directional control is achieved by using a non-rotating drill string with an asymmetrical leading edge. The asymmetry of the leading edge creates a steering bias, which allows the operator to control the direction of the drill bit. The actual path of the pilot hole is monitored during drilling by taking periodic readings of the inclination and azimuth. These readings are used to calculate the horizontal and vertical coordinates along the pilot holes relative to the initial entry point on the surface.

Once the pilot hole is complete, it is enlarged using reaming tools that are often custom made for a particular diameter pipe or type of soil. The reamers are typically attached to the drill string at the exit point and are rotated and drawn to the drilling rig, thus enlarging the pilot hole with each pass. Pipe installation is accomplished by attaching a prefabricated pull section behind a reaming assembly at the exit point and pulling the entire assembly back to the drilling rig. When the pipe is in place beneath the river, tie-in welds on the river/stream banks complete the crossing.

Ideally, horizontal directional drilling involves no disturbance to the bed or banks of a stream. However, it is possible that geologic irregularities could be encountered during drilling, and drilling could fail. This plan describes the potential for failure of horizontal directional drilling and the contingency methods that would be implemented in the event drilling were to fail.

Failure of a directional drill can be defined two ways: either as the release of drilling mud during the drilling process, or as the inability to complete the crossing using the horizontal directional drill technique. The feasibility of the horizontal directional drill method is primarily dependent on the local geologic setting. Typically, horizontal directional drilling is not feasible in areas of glacial till or outwash interspersed with boulders and cobbles, fractured bedrock, or non-cohesive coarse sands and gravels. These formations increase the likelihood drilling would fail due to refusal of the drill bit, loss

of drilling fluid through fractures or weak areas in the ground, or collapse of the bore hole in non-cohesive, unstable substrate.

To ascertain the geologic setting at the waterbodies and determine if horizontal directional drilling would be feasible, NBP has obtained soil borings from each side of each waterbody. The investigations indicate that the waterbodies are underlain by soils that appear favorable for horizontal directional drilling. While the borings can provide a general basis for determining feasibility, they cannot predict all problems that could occur.

III. MONITORING PROCEDURES

The Environmental Inspector(s) and construction personnel will continuously monitor operations during drilling activities. Monitoring activities will include:

- Visual inspection along the drill path, including monitoring the waterbody for evidence of a release.
- Continuous examination of drilling fluid pressures and returns flows.

The drilling operator will provide information regarding drilling conditions to the Environmental Inspector(s) throughout the course of drilling activities. The Environmental Inspector(s) will document all monitoring observations.

IV. NOTIFICATION PROCEDURES

If in the course of an inspection an inadvertent release is discovered, steps will be taken by construction personnel to contain the release as described below in Section V, Corrective Action and Cleanup. Notification procedures of NBP construction management personnel and regulatory agencies are detailed in this section.

If monitoring indicates an in-stream release, the Environmental Inspector(s) will immediately notify NBP's construction management personnel. NBP will notify appropriate federal and state agencies as soon as possible by telephone and/or facsimile of an in-stream release event, detailing the nature of the release and corrective actions being taken. The notified agencies will determine whether additional measures need to be implemented. If it is determined that the release can not be remedied without causing additional environmental impact, NBP will request agency approval to continue the drilling operations.

If a release occurs that may migrate downstream and affect water quality, downstream water users will be contacted by NBP. The contacts and telephone numbers of downstream users will be assimilated prior to commencement of construction, and maintained on-site.

V. CORRECTIVE ACTION AND CLEANUP

By monitoring drilling operations continuously, NBP intends to correct problems before they occur. In addition, containment equipment including earth-moving equipment, portable pumps, hand tools, sand, hay bales, silt fence, lumber, and a suction dredge will be readily available at the drill site. However, if a release does occur, the following measures will be implemented to stop or minimize the release and to clean it up:

- The drilling contractor will decide what modifications to make to the drilling technique or composition of drilling fluid (*i.e.*, thickening of fluid by increasing bentonite content) to reduce or stop minor losses of drilling fluid.

- If a minor bore path void is encountered during drilling; making a slight change in the direction of the bore path may avoid loss of circulation.

- If the bore head becomes lodged resulting in loss of drilling pressure, the borehole may be sized by moving the bore head back and forth to dislodge the stuck materials.

Release in the Water:

- If necessary, drilling operations will be reduced or suspended to assess the extent of the release and to implement other possible corrective actions.

- If public health and safety are threatened, drilling fluid circulation pumps will be turned off. This measure will be taken as a last resort because of the potential for drill hole collapse resulting from loss of down-hole pressure.

- If monitoring indicates that the intake water quality at downstream user locations is impacted to the extent that it is no longer suitable for treatment, alternative water sources (*i.e.*, trucked or bottled water) will be provided to impacted users.

Release on Land:

- If a land release is detected, the drilling crew will take immediate corrective action to contain the release and to prevent migration off-site.

- The contractor will construct pits and berms around the borehole entry point to contain inadvertent releases onto the ground.

- Any drilling mud released into the pits will be pumped by contractor personnel into a mud-processing unit for recycling of drilling fluid and separation of cuttings.

- Additional berms will be constructed around the bore pit as directed by the Environmental Inspector(s) to prevent release materials from flowing into the waterbody.

- If the amount of an on-land release does not allow practical collection, the affected area will be diluted with fresh water and allowed to dry. Steps will be taken (such as berm, silt fence and/or hay bale installation) to prevent silt-laden water from flowing into the waterbody.

- If hand tools cannot contain a small on-land release, small collection sumps (less than 5 cubic yards) may be constructed to pump the release material into the mud processing system.

VI. ABANDONMENT

If corrective actions do not prevent or control releases from occurring into the waterbody, NBP may opt to re-drill the hole along a different alignment or suspend the project altogether. In either case, the following procedures will be implemented to abandon the drill hole.

- The method for sealing the abandoned drill hole is to pump thickened drilling fluid into the hole as the drill assembly is extracted, and using cement grout to make a cap.
- Closer to the surface (within approximately 10 feet of the surface), a soil cap will be installed by filling with soil extracted during construction of the pit and berms.
- The bore hole entry location will be graded by the contractor to its original grade and condition after the drill hole has been abandoned.